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10/569,002	02/15/2006	Mitsuhiro Kashiwabara	3712174.00518	1753

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EXAMINER	
HOLLWEG, THOMAS A	

ART UNIT	PAPER NUMBER
2879	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

chicago.patents@klgates.com

Office Action Summary	Application No.	Applicant(s)	
	10/569,002	KASHIWABARA, MITSUHIRO	
	Examiner	Art Unit	
	Thomas A. Hollweg	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,12,15-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,12,15-18 and 20-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 21, 2010, has been entered. No claims are added or canceled. Claims 11, 12, 14-18 and 20-23 currently pending.

2. The amendment to claim 20 is acknowledged. The previous objection to claim 20 is withdrawn.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 11, 12, 14-17, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyama et al., U.S. Patent No. 6,831,406 B1, in view of Seo et al., U.S. Patent Application Publication No. 2002/0113546 A1.**

5. **With regard to claim 11,** in figure 8, Fukuyama discloses an organic EL device comprising: a plurality of light emitting layers (14a-c) including a red light emitting layer (14a), a green light emitting layer (14b), and a blue light emitting layer (14c) (col. 8, lines

13-31) laminated between an anode (10) and a cathode (18) (col. 3, lines 47-63); and an intermediate layer (16a, 16b) comprised of an organic material is provided in at least one location between said light emitting layers (14a-c) (col. 8, lines 38-50); wherein the red light emitting layer (14a) is formed in contact with a hole transporting layer (12) that is formed on the anode (col. 8, lines 13-31).

6. Fukuyama does not expressly disclose **1)** that said intermediate layer has an electron blocking property and a hole transporting property or **2)** that the green light emitting layer comprises a hole transporting material and an electron transporting material.

7. **1)** Figure 8 of Fukuyama is understood to be a combination of the embodiments shown in figure 3, where an intermediate layer (16b) is formed of an electron transporting material, and figure 7, where having three distinct light emitting layers (14a-c). Figure 4 teaches an embodiment where an intermediate layer (12a) is formed of a hole transporting material (col. 7, lines 12-18), so the holes may be efficiently transported to each emission layer (col. 7, lines 19-21)

8. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the embodiment of Fukuyama figure 8 as a combination of the embodiments of figures 4 and 7, where said intermediate layer has an electron blocking property and a hole transporting property, as taught in figure 4, so the holes may be efficiently transported to each emission layer.

9. **2)** Fukuyama teaches that the green light emitting layer may comprise a combination of charge transporting materials and green light emitting materials (col. 6,

lines 21-56), however it does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

10. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

11. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, because the green light emitting layer of Fukuyama figure 8, is between the red and blue light emitting layers and it is necessary to transport both holes and electrons through the green light emitting layer so that both the red and blue light emitting layers have efficient emission.

12. **With regard to claim 12,** in the device described in the rejection of claim 1 above, where the intermediate layer has an electron blocking property and a hole transporting property, a HOMO-LUMO energy gap of the intermediate layer is greater than a HOMO-LUMO energy gap of at least one material constituting the light emitting layers disposed adjacent to the intermediate layer (energy gap property is inherent to the materials discloses).

13. **With regard to claim 14,** in figure 8, Fukuyama discloses that the intermediate layer (16b) is provided at least between the green light emitting layer (14b) and the blue light emitting layer (14c), and in the device described in the rejection of claim 1 above,

where the intermediate layer has an electron blocking property and a hole transporting property, the intermediate layer restricts the injection of electrons into the green light emitting layer and promotes the injection of holes in to the blue light emitting layer.

14. **With regard to claim 15,** in the device described in the rejection of claim 1 above, where the intermediate layer has an electron blocking property and a hole transporting property, the LUMO energy level of the intermediate layer having a hole transporting property is higher than a LUMO energy level of an electron transporting component in the green light emitting layer.

15. **With regard to claim 16,** in figure 8, Fukuyama discloses that the intermediate layer (16a) is provided at least between the red light emitting layer (14a) and the green light emitting layer (14b), and in the device described in the rejection of claim 1 above, where the intermediate layer has an electron blocking property and a hole transporting property, the intermediate layer restricts the injection of electrons into the red light emitting layer and promotes the injection of holes in to the green light emitting layer.

16. **With regard to claim 17,** in the device described in the rejection of claim 1 above, where the intermediate layer has an electron blocking property and a hole transporting property, the LUMO energy level of the intermediate layer having a hole transporting property is higher than a LUMO energy level of an electron transporting component in the red light emitting layer.

17. **With regard to claim 20,** in figure 8, Fukuyama discloses an organic EL device comprising: and anode (10); a hole transport layer (12) on the anode (10) (col. 3, lines 47-63); a plurality of light emitting layers (14a-c) including a red light emitting layer

(14a), a green light emitting layer (14b), and a blue light emitting layer (14c) laminated on the hole transport layer (12) such that the red light emitting layer (14a) is formed in contact with the hole transport layer (12) that is formed directly on the anode (10) (col. 8, lines 13-31); an electron transport layer (16c) formed on the blue light emitting layer (14c); a cathode (18) formed on the electron transport layer (16c) (col. 3, lines 47-63); an intermediate layer (16b) comprised of an organic material provided between the blue light emitting layer and the green light emitting layer, wherein the red light emitting layer (14a) is configured so that a portion of the holes injected through the hole transport layer (12) are re-coupled in the red light emitting layer to give red light emission and a remainder of the holes are transported into the green light emitting layer (col. 8, lines 13-31).

18. Fukuyama does not expressly disclose **1)** that said intermediate layer has an electron blocking property and a hole transporting property or **2)** that the green light emitting layer comprises a hole transporting material and an electron transporting material.

19. **1)** Figure 8 of Fukuyama is understood to be a combination of the embodiments shown in figure 3, where an intermediate layer (16b) is formed of an electron transporting material, and figure 7, where having three distinct light emitting layers (14a-c). Figure 4 teaches an embodiment where an intermediate layer (12a) is formed of a hole transporting material (col. 7, lines 12-18), so the holes may be efficiently transported to each emission layer (col. 7, lines 19-21)

20. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the embodiment of Fukuyama figure 8 as a combination of the embodiments of figures 4 and 7, where said intermediate layer has an electron blocking property and a hole transporting property, as taught in figure 4, thereby restricting the injection of electrons into the green light emitting layers and promoting the injection of holes into the blue light emitting layer, so the holes may be efficiently transported to each emission layer.

21. **2)** Fukuyama teaches that the green light emitting layer may comprise a combination of charge transporting materials and green light emitting materials (col. 6, lines 21-56), however it does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

22. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

23. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, such that some of the holes transferred from the red light emitting layer are re-coupled in the green light emitting layer to give green light emission and the remainder of the holes are transported into the blue light emitting layer, and such that some of the electrons injected from the blue light emitting layer contribute to green light emission

and the remainder of the electrons are transported into the red light emitting layer, because the green light emitting layer of Fukuyama figure 8, is between the red and blue light emitting layers and it is necessary to transport both holes and electrons through the green light emitting layer so that both the red and blue light emitting layers have efficient emission.

24. **With regard to claim 22,** in the device described in the rejection of claim 1 above, where the intermediate layer has an electron blocking property and a hole transporting property, a HOMO-LUMO energy gap of the intermediate layer is greater than a HOMO-LUMO energy gap of all the materials constituting the light emitting layers disposed adjacent to the intermediate layer (energy gap property is inherent to the materials discloses).

25. **With regard to claim 23,** in figure 8, Fukuyama discloses an organic EL device comprising: a plurality of light emitting layers (14a-c) including a red light emitting layer (14a), a green light emitting layer (14b), and a blue light emitting layer (14c) (col. 8, lines 13-31) laminated between an anode (10) and a cathode (18) (col. 3, lines 47-63); and an intermediate layer (16a, 16b) comprised of an organic material is provided in at least one location between said light emitting layers (14a-c), said intermediate layer having an electron transporting property and a hole blocking property (col. 8, lines 38-50); wherein the red light emitting layer (14a) is formed in contact with a hole transporting layer (12) that is formed on the anode (col. 8, lines 13-31).

26. Fukuyama teaches that the green light emitting layer may comprise a combination of charge transporting materials and green light emitting materials (col. 6,

lines 21-56), however it does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

27. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

28. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, because the green light emitting layer of Fukuyama figure 8, is between the red and blue light emitting layers and it is necessary to transport both holes and electrons through the green light emitting layer so that both the red and blue light emitting layers have efficient emission.

29. **Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyama and Seo, as applied to claim 11, further in view of Yamazaki et al., U.S. Patent Application Publication No. 2004/0012331 A1.**

30. **With regard to claim 11,** in figure 8, Fukuyama discloses an organic EL device comprising: a plurality of light emitting layers (14a-c) including a red light emitting layer (14a), a green light emitting layer (14b), and a blue light emitting layer (14c) (col. 8, lines 13-31) laminated between an anode (10) and a cathode (18) (col. 3, lines 47-63); and an intermediate layer (16a, 16b) comprised of an organic material is provided in at least one location between said light emitting layers (14a-c) (col. 8, lines 38-50); wherein the

red light emitting layer (14a) is formed in contact with a hole transporting layer (12) that is formed on the anode (col. 8, lines 13-31).

31. Fukuyama does not expressly disclose **1)** a color filter on the light take-out surface, **2)** that said intermediate layer has an electron blocking property and a hole transporting property or **3)** that the green light emitting layer comprises a hole transporting material and an electron transporting material.

32. **1)** Yamazaki teaches an organic EL device with a color filter on the light take-out surface side [0061].

33. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama device where a color filter is disposed on the light take-out surface, as taught by Yamazaki, so that red, green and blue light may be selectively emitted.

34. **2)** Figure 8 of Fukuyama is understood to be a combination of the embodiments shown in figure 3, where an intermediate layer (16b) is formed of an electron transporting material, and figure 7, where having three distinct light emitting layers (14a-c). Figure 4 teaches an embodiment where an intermediate layer (12a) is formed of a hole transporting material (col. 7, lines 12-18), so the holes may be efficiently transported to each emission layer (col. 7, lines 19-21)

35. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the embodiment of Fukuyama figure 8 as a combination of the embodiments of figures 4 and 7, where said intermediate layer has an electron

blocking property and a hole transporting property, as taught in figure 4, so the holes may be efficiently transported to each emission layer.

36. **3)** Fukuyama teaches that the green light emitting layer may comprise a combination of charge transporting materials and green light emitting materials (col. 6, lines 21-56), however it does not expressly disclose that the green light emitting layer comprises a hole transporting material and an electron transporting material.

37. Seo, in figure 7, teaches an organic EL device having a red (508), a green (507), and a blue (505) light emitting layer laminated between an anode (501) and a cathode (503) where the green light emitting layer (507) comprises a hole transporting material (α-NPD) and an electron transporting material (DPVBi) [0142-0146].

38. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama device where the green light emitting layer comprises a hole transporting material and an electron transporting material, as taught by Seo, because the green light emitting layer of Fukuyama figure 8, is between the red and blue light emitting layers and it is necessary to transport both holes and electrons through the green light emitting layer so that both the red and blue light emitting layers have efficient emission.

39. **Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyama and Seo, as applied to claims 11 and 16 above, in further view of D'Andrade et al., U.S. Patent Application Publication No. 2002/0197511 A1.**

40. **With regard to claim 21,** all of the limitations are disclosed by Fukuyama and Seo, as discussed in the rejection of claims 11 and 16 above, except they do not

expressly disclose that the organic material for the intermediate layer includes at least one of TPD and CBP.

41. D'Andrade teaches that TPD and CBP are ideal materials with hole transport and electron blocking properties [0044].

42. At the time of invention, it would have been obvious for a person having ordinary skill in the art to construct the Fukuyama and Seo device described in the rejection of claim 16 above, where the organic material for the intermediate layer includes at least one of TPD and CBP, because these materials have hole transport and electron blocking properties, as taught by D'Andrade, and they would control the stream of electrons so that the device may emit excellent white light.

Response to Arguments

43. Applicant's arguments have been considered, but are moot in view of the new grounds for rejection.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas A. Hollweg whose telephone number is (571) 270-1739. The examiner can normally be reached on Monday through Friday 7:30am-5:00pm E.S.T..

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TH/

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